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10/706,676

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EXAMINER

PATEL, KAUSHIKKUMAR M

ART UNIT

PAPER NUMBER

2188

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                       |                                     |  |
|------------------------------|---------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/706,676  | <b>Applicant(s)</b><br>ZOHAR ET AL. |  |
|                              | <b>Examiner</b><br>KAUSHIKKUMAR PATEL | <b>Art Unit</b><br>2188             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to applicant's communication filed May 08, 2008 in response to PTO Office Action mailed January 09, 2008. The applicant's remarks and amendments to the claims and/or specification were considered with the results that follow.
2. In response to last Office Action, claims 29 and 30 have been amended. No claims have been canceled. No claims have been added. As a result, claims 1-30 remain pending in this application.

### ***Response to Arguments***

3. Applicant's arguments with respect to claim 1-30 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenau et al. (US 2004/0054866), Ofer et al. (US 6,209,059) and Applicant's admitted prior art (APA herein after, P.G. Pub # US 2005/0102469).

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As per claims 1, 2, 10 and 11, Blumenau teaches a storage system (Blumenau, fig. 1, item 20)/method, comprising:

a plurality of data storage logical units (LUs) (Blumenau, fig. 3, item 53) comprising a plurality of physical media (Blumenau, fig. 1, items 28, 29, 30, 31, par. [0058]), the plurality of LUs being adapted to receive commands/plurality of strings of commands and responsive to the commands to store and recall data (Blumenau, par. [0060]); and

a plurality of ports (Blumenau, fig. 3, items 51, 52).

Blumenau fails to teach but in an analogous art, Ofer teaches port/controller being adapted to maintain a plurality of LU command queues, each of the plurality of LU command queues corresponding to a respective one of the LUs, such that upon receiving a command directed to one of the LUs, the port places the received command in the respective LU command queue (Ofer, fig. 2, items 27a1 - 27an; col. 4, lines 1-20).

The combination of Blumenau and Ofer would have been obvious to one of the ordinary skill in the art at the time the invention was made because the method of Ofer allows a logical device to be added, removed or repositioned without requiring the storage system to be taken off-line (Ofer, abstract).

Thus, Blumenau and Ofer further teaches the port converts the received commands to one or more converted commands at least some of which are directed the plurality of the physical media of the one of the LUs, and conveys the at least some converted commands to the plurality of the physical media (Blumenau, fig. 4, item 80, par. [0060]; Ofer, col. 4, lines 58-60). Blumenau and Ofer fail to teach but in an

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analogous art APA teaches conveying commands in an order determined by the respective LU command queue (APA, par. [0002], “the storage system needs to preserve the order of these different requests and commands to avoid inconsistencies accruing in the storage system.”).

Thus, the combination of Blumenau, Ofer and APA would have been obvious to one of the ordinary skill in the art at the time the invention was made to avoid inconsistencies in the storage system as taught by APA above.

As per claims 3 and 12, Bluamenau, Ofer and APA teach wherein the plurality of ports comprises a first port and a second port (Blumenau, fig. 3),

wherein the first port conveys a first string of the at lest some converted commands in a first order to the plurality of the physical media (see claim 1, above, which teaches converting commands and conveying the commands in the order);

wherein the second port conveys a second string of the at lest some converted commands in a second order to the plurality of the physical media (see claim 1, above, which teaches converting commands and conveying the commands in the order);

wherein the plurality of the physical media is adapted to receive the first string and to store and recall the data in response to the first order and to receive the second string and to store and recall the data in response to the second order (as explained with respect to claim 1, above the order is necessary to avoid inconsistencies and storing and recalling data to/from physical media is inherent in the system of Blumenau, Ofer and APA).

As per claims 4 and 13, Blumenau teaches wherein the command comprises a request according to a small computer system interface (SCSI) protocol, and wherein the storage system is operative according to the SCSI protocol (Blumenau, pars. [0063], [0069]).

As per claims 5 and 14, Blumenau teaches wherein each of the ports comprises a respective central processing unit (CPU) which operates each of the ports substantially independently (Blumenau, fig. 4, item 76, here it is also noted that each port has its CPU and memory for performing various functions means each port operates independently).

As per claims 6 and 15, Blumenau and Ofer teach wherein the command comprised in one of one or more strings of commands (Ofer, col. 4, lines 1-20; host issues a plurality of data requests, means string of commands), each of string of commands being directed via one of the ports to a respective one of the LUs (Ofer, col. 4, lines 1-11), and comprising a coupling (fig. 1, here it is noted that coupling is inherent to couple the port to the host) which:

receives the command comprised in the one or more strings; sorts the commands according to the ports via which the commands are directed and conveys the commands to the ports to which the commands are directed (Blumenau, fig. 4, shows a plurality of hosts are connected to the storage controller with several ports and

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each port is assigned LUs (fig. 3), where it is readily apparent that the commands must be sorted according to ports and as taught in claim 1, Ofer teaches placing respective commands in respective command queues, Ofer, col. 4, lines 1-20).

As per claims 7, 8, 16 and 17, Blumenau, Ofer and APA teach storage system (Blumenau/Ofer fig. 1; APA, par. [0002]), where the host requests the data to/from storage system (e.g. read and write command) and the port/controller converts the received logical command into physical commands (see claim 1), where it is readily apparent that the converted commands recalls the data (in case of read command) from the physical media and/or stores data received from the host into the physical media of the storage system (write command), thus satisfying the limitations of claims.

As per claims 9 and 18, Blumenau teaches wherein the plurality of physical media comprises the data (inherent) and wherein the port is adapted to track changes of the location of the data within the plurality of the physical media (Blumenau, figs. 5-10, teaches various mapping tables, which tracks the data residing in the physical media and it is inherent in the system of Blumenau that during the period of the time the data stored in the physical media changes (e.g. modified, added, deleted etc.) and thus the mapping tables of the controller (port) keeps track of the changes of the data locations).

As per claims 19 and 20, Blumenau and Ofer teaches wherein each port uses at least one table and one or more functions to convert logical data in the received command to the data suitable for a respective physical media to which the command is directed (Blumenau, pars. [0060], [0148]; Ofer, col. 1, lines 34-50, col. 4, lines 58-60).

As per claims 21 and 22, Blumenau/APA teaches wherein at least one of the converted commands directed to the plurality of the physical media is first sent to a fast access time memory acting as a buffer, said fast access time memory being adapted to redirect the converted command to a respective physical media (Blumenau, par. [0060], teaches cache memory, which is first accessed and if data is not stored then the request is forwarded to the physical media. Ofer, par. [0002] also teaches a cache).

As per claims 23 and 24, Blumenau teaches wherein the plurality of the physical media comprises a plurality of slow access time non-volatile physical media (Blumenau, par. [0058], optical drives, tape drives are slow access time medias).

As per claims 25 and 26, Ofer teaches wherein a particular physical media of the plurality of the physical media changes over time (Ofer, col. 5, lines 15-26).

As per claims 27 and 28, Blumenau teaches storage system providing logical units (LUNs) with RAID functionality (Blumenau, par. [0062]) where it is readily apparent that data is distributed across the plurality of physical media.



As per claims 29 and 30, Blumenau teaches a storage system with SCSI protocol (see claim 4 above), where it is readily apparent that the hosts are using SCSI commands for reading and writing data to/from storage system (physical storage media) and thus it is inherent in the system of Blumenau to determine the type of command (e.g. read, write etc.). It is also noted that the format of SCSI command requires use of a logical block address and a length of the data string, thus it is also inherent to convert the logical block address and data string into the appropriate physical command.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAUSHIKKUMAR PATEL whose telephone number is (571)272-5536. The examiner can normally be reached on 7.30 am - 4.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hyung S. Sough/  
Supervisory Patent Examiner, Art Unit 2188  
08/28/08

KAUSHIKKUMAR PATEL  
Examiner  
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/kmp/